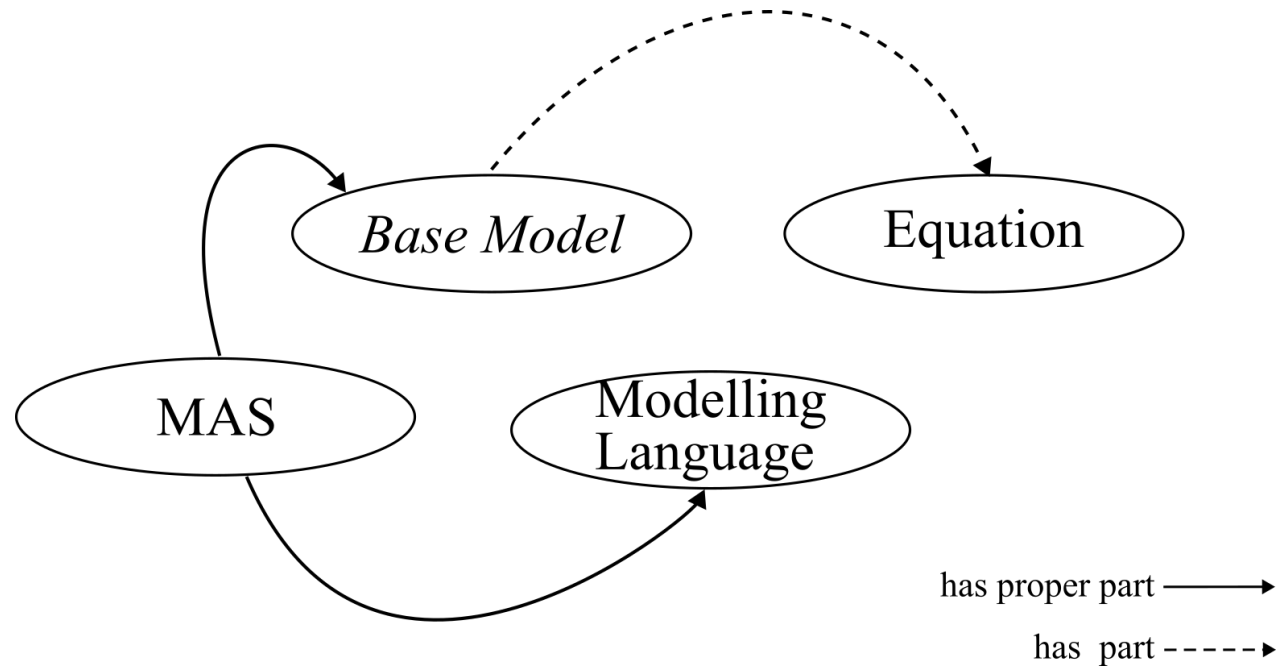# Modelling Assistance Software

Definition 8 (Base Model) *A base Model is a system of equations with non-resolved indexed parameters and variables.*

Axiom 5 (Base Models have equations as parts) *In the case of one equation models the Base Model is the equation.*

$$BM(bm) \rightarrow \exists eq \left[equation(eq) \wedge is\_part(eq, bm) \right]$$

Definition 9 (Modelling assistance software) *A Modelling assistance software (MAS) is a software with a specific language used to systematically generate mathematical Models.*
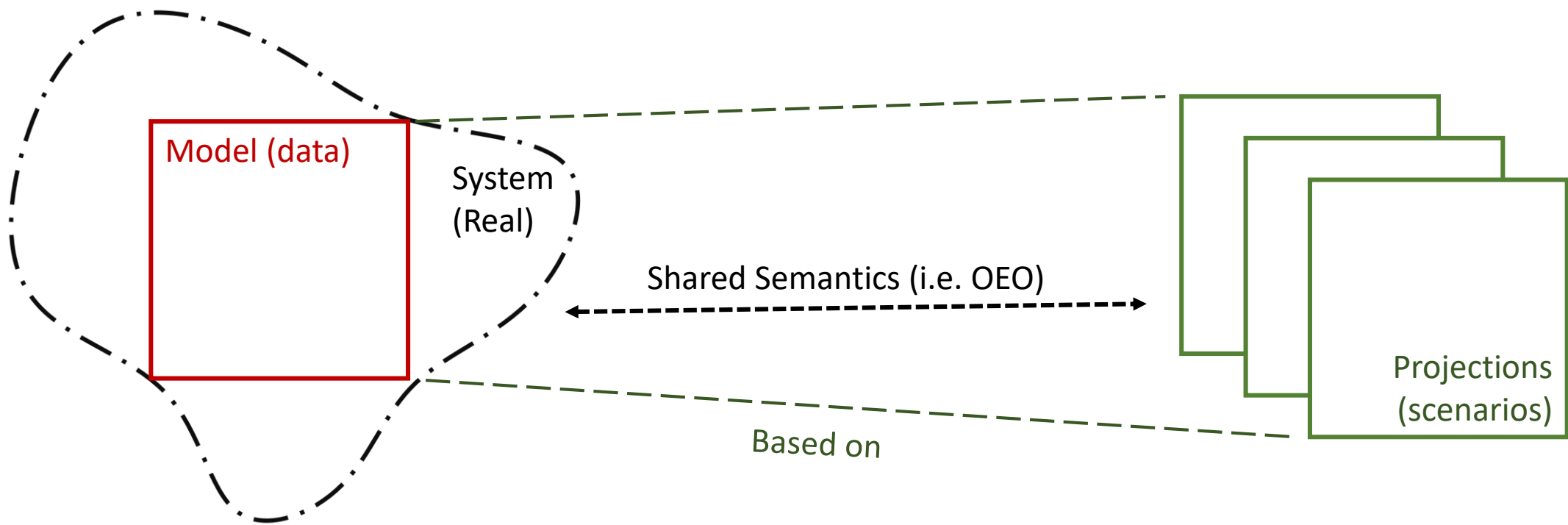
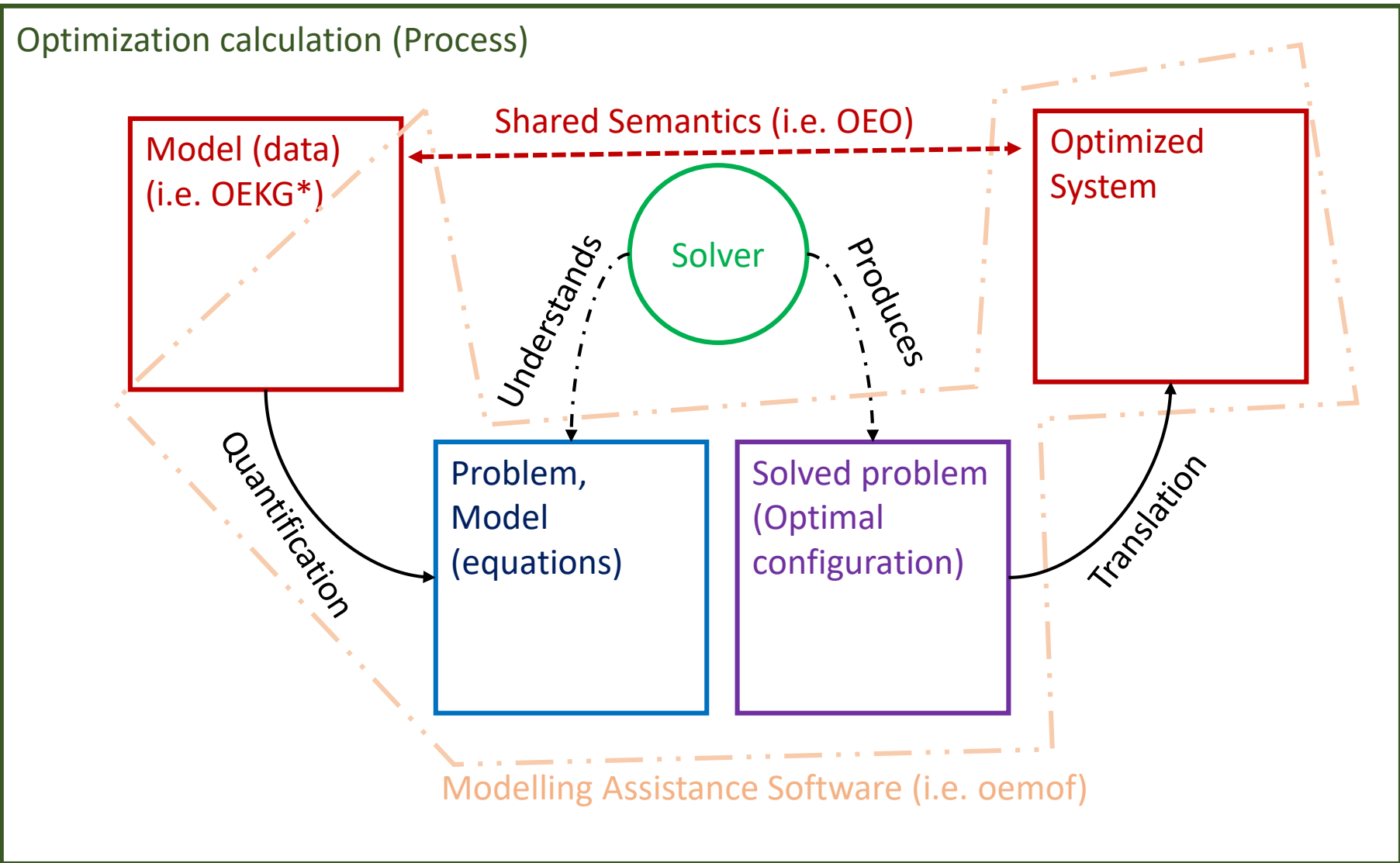$$MAS(mas) \rightarrow \exists bm \left[BM(bm) \wedge is\_proper\_part(bm, mas) \right]$$

$$MAS(mas) \rightarrow \exists lang \left[Lang(lang) \wedge is\_proper\_part(lang, mas) \right]$$

Competency question 1 (Modelling assistance software) *Which base Model and language does a given Modelling assistance software A have?*

Competency question 2 (Base Model composition) *Given a base Model M, Which equations compose it?*

Competency question 3 (Equations as parts of base Models) *There is a base Model M with a single equation X, is M also X?*

Optimization calculation (Process)

Model (data) (i.e. OEKG*)

Shared Semantics (i.e. OEO)

Optimized System

Solver

Understands

Produces

Quantification

Problem, Model (equations)

Solved problem (Optimal configuration)

Translation

Modelling Assistance Software (i.e. oemof)

* If structured

Next Paper: Channelling semantic web technologies for unambiguous energy systems optimization problem definitions

RQ: Can the mathematical component of an energy system optimization problem definition be described unambiguously using a language compatible with semantic web technologies?

RQS1: How do we define the mathematical component of an energy system optimization problem?

RQS2: Can the component be defined unambiguously using ANY language?

RQS3: What are the characteristics of a mathematical language compatible with the semantic web?

RQS3A Are the semantics of mathematical optimization equivalent to the ones already available in OpenMath Contend dictionaries?

RQS4: Using available solutions, how would an unambiguous definition of some common mathematical optimization methodologies would look like?